Assessing the Cost of Web-Based Training Programs

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Investments in web-based training (WBT) have increased presumably to attain cost savings and performance improvement. However, it has been difficult to assess the cost of WBT. In order to conduct an accurate cost analysis of WBT, three primary issues remain as follows: 1) identifying the missing cost components of WBT, 2) assessing the costs of these missing components, and 3) establishing a model to identify the costs of future WBT.

Keywords: Web-based Training, Financial Benefits, Cost Analysis

Training expenditures in the United States were estimated in 1998 to be $60 billion (*Training* , 1998). Of that amount, it has been further estimated that investments in web-based training (WBT) has been $3.5 billion in domestic and $5 billion in overseas, and will expand to $50 billion by 2010 (Levis, 2002). Since the investment of corporate training programs has been rapidly increasing, organizations have been growing demand to improve cost reduction and cost effectiveness for the worth of training.

Investments in WBT have increased based upon the belief that it has the potential to reduce training time and cost, increase the volume of trainees, and in the end be as effective in improving job performance of employees. The European Commission (2003) asserts that given a rapidly changing global business environment, WBT contributes to organizational efforts to improve job performance. In addition, Bernadez (2003) states that online learning provides an organization with cost efficiency of training in that it can do anytime and anywhere, saving direct and indirect expenditures.

At this point, it is necessary to know how much actual cost of WBT is spending and whether its cost is justifiable (Bartley & Golek, 2004) and all its benefits are equitable to all stakeholders and an organization (Willis, 2003). The calculation of cost analysis of training becomes more a critical issue for financial benefit of training than ever before (Martin & Lomperis, 2002; Bartley & Golek, 2004).

The reason is that, based on the cost analysis of WBT, decision makers are able to predict financial benefits of their online programs and make right decision to determine the training costs and cost effectiveness for their organizations. For example, after analyzing the costs of WBT, decision makers can set up its budgets and determine whether or not the program is creating, reshaping or canceling in their organizations (Rumble, 2001).

However, researchers and practitioners have been struggling to determine how to precisely measure the cost analysis of WBT that can lead less cost reduction and more cost effectiveness in the workplace. Today it can be more difficult to estimate the expenditure of WBT, since the context and activities of WBT vary by the types of organizations and jobs, background of learners, availability of educational media, and so on (Jung & Rha, 2000; Curtain, 2002).

Mostly, the cost of training activities is not able to calculate accurately due to the lack of information of the budget or account. For example, activities may exceed the budget or accounting fiscal year, personal salary data are not available, or accommodation costs are not clear (Rumble, 2001). In large organizations, it is especially hard to catch all training expenses spent due to the absence of enormous activity records and fiscal accounting systems (Curtain, 2002). In addition, an organization could not provide accurate data due to its confidentiality (Curtain, 2002).

Meanwhile, researchers frequently face limits in calculating accurate training costs (Curtain, 2002). In some cases, some researchers include indirect costs related to salary that other researchers do not include in calculating cost analysis of WBT. Accordingly, the total costs among studies will be significantly different (Odden, Archibald, Fermanich, & Gallagher, 2002). In fact, most organizations also subjectively evaluate costs and benefits of WBT with different methodologies, since they only use available data in their own organizations.

Accordingly, this makes it more difficult to estimate accurate costs of WBT in order to measure cost savings and cost effectiveness in the workplace (Bakia, 2000). Whereas organizations put a high value on calculating financial benefits of WBT in order to provide effective training and performance with the least dollars, previous studies still have been confusing and difficult to calculate the cost analysis of WBT in the workplace.

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The purpose of this paper is to describe what is meant by web-based training, to identify the factors to consider when identifying the costs of training, and discuss the costs of web-based training, including a discussion of the missing components in most cost analysis of web-based training.

The primary methodology for this study is a literature review on cost analysis of WBT in the workplace. Over eighty articles for this study are reviewed and analyzed through academic journals, practitioner periodicals, and books published from 1994 to 2005. Authors have searched for recent literatures, since this study is related to technology that plays a key role in today's rapidly changing and competitive business environment. Key words in the databases and journals are e-learning, cost analysis of WBT, cost benefit analysis of WBT, financial benefits of WBT, and related terms.

The process used in this study consists of the following two steps. The first step identified the factors needed to consider in calculating the costs of training programs. In the first step, the literature was reviewed to understand the phenomenon to formulate the study. The second step expanded the literature into WBT to analyze and specify the costs of WBT based upon the factors identified in the first step. In the second step, frequently appeared authors are selected in the literature.

Web-Based Training (WBT)

Web-based Training (WBT) refers to learner-centered learning through the Internet using a variety of educational media such as text, pictures, animations, audio, and video. Learners are able to select learning activities and a favorite media format by their own preference and learning styles. For example, a learner can watch a video instead of reading texts, simply clicking a video button on the Web Instruction.

In addition, a learner interacts with his/her instructor and peers both synchronously and asynchronously. In a synchronous way, a learner and an instructor log in and communicate at the same time through video conferencing, web casting, live-chat room and so on. In an asynchronous way, a learner and an instructor communicate at any time through discussion boards, forum, email, and so on.

Not surprisingly, WBT significantly impacts on corporate training with its enormous potential benefits that maximize current economic situation - rapidly changing business environments and global labor market needs. The one of major benefits of WBT is that learners can save training cost and time. Employees at Aetna US Health Care can minimize its training time to one or three weeks from six weeks in the classroom through online courses (Noe, 2004). Furthermore, WBT can be of much benefit to increase the volume of learners in geographically dispersed locations (Sheperd, 1999; Evan & Hasses, 2001; Noe, 2004). Learners can access their courses through Internet across offices, metropolitan areas, and countries, wherever they are.

In addition, they can receive just in time training and support from their instructors, experts, and peers through Internet (Wild, R. & Griggs, K., & Downing, T., 2002). According to Sheperd (1999), WBT is able to improve job performance of learners to be competitive in the global market with following four factors; "individualism", "immediate constructive feedback", "active learner involvement", and "an appeal to multiple senses". For example, learners can be more effectively associated with multi media - such as graphics, sounds, animation, and so on - and be more actively involved in a variety of learning activities - such as practices, questions, discussion, and so on - through the Web in order to improve their learning performance (Noe, 2004).

Another major benefit of WBT is that learners can control their online courses to their own learning pace, learning style, and learning activity (Noe, 2004; Bartely & Golek, 2004). For example, they can control their learning speeds, choose appropriate practices and questions, and interact with their instructor or peers on their demands (Noe, 2004). Additional major benefits of WBT include as follows; learners can easily access to all required resources to perform training and instructors or designers can quickly update contents through the Web (e.g. using HTML), reducing extra paper works (Noe, 2004; Evan & Hasses, 2001).

A benchmarking survey of WBT in 2001 reported that 43% of companies participated in the survey had already implemented or were implementing WBT and 33% of them would implement within next three years in the United States and Canada (Sofres, 2001). However, many recent studies show that actual usage of WBT has been dramatically declined. According to ASTD in 2001, only 14% of actual users prefer to WBT and over 60% of them drop out their online courses in the workplace (Buren & Sullivan, 2001).

In previous research (Kong & Zirkle, 2005), five primary reasons for high drop out rates of early WBT are found: 1) low quality of contents, 2) lack of organization management, 3) technological limits, 4) lack of learner acceptance, and 5) lack of instructor acceptance. Firstly, early WBT too much focuses on cognitive domain only, while cognitive, affective, and psychomotor activities are required in WBT (Stahl, 2001; Rosenberg, 2002). Online course learners just turn page to page without any learning activity that can be interactive with them (Woodill, 2004).

Low quality of contents also results from not only improper assessment that does not match learners' needs but also absence of formative evaluation that does not provide learners with appropriate feedback (Buchanan, 1999; Yilmaz & Tuzum, 2001; Rosenberg, 2002). Irrelevant graphics (e.g. fancy banners, splash pages, etc.) also do not contribute to the instructional value of multimedia (Kedney & Puckett, 2003).

In addition, early online courses use only one generic template to create a variety of courses (Nantel, 2001) and do not take into account customization and future maintenance to have the content updated for quality assurance (Woodill, 2004). Contents also incorrectly assume only one audience and complex contents are frequently oversimplified (Rosenberg, 2004).

Secondly, many organizations do not make the right decision to purchase appropriate online courses from professional vendors, without considering how to best fit the program in their organizations. They usually buy the most courses offered in the market with the least dollars (Naish, 2004; Mullich, 2004; Rosenberg, 2002). Further, learners do not receive sufficient support from their management to conduct training. They have insufficient time to learn, many interruptions from their work, lack of technological knowledge, and a lack of support from their bosses (Naish, 2004). Additionally, trainees rarely realize the ultimate goals of both individuals and their organizations due to lack of learning orientation (Rossett & Schafer, 2003).

Thirdly, most learners in early WBT are often isolated and lack social interaction due to technological limits (European Commission, 2003). The main barrier of technology is that technology has low bandwidth and lacks high-speed Web connections for interactivity between an instructor and learners; thus, it produces frustration and little credibility between them (Wulf and Schinzel, 1998; Dreyfus, 2001; Yilmaz and Tuzun, 2001).

Fourthly, many learners get frustrated and depressed in new technology environment, since they do not know how to be effective self-learners (e.g. self-motivation and self-discipline, etc.) (Rossett & Schafer, 2003). Additionally, many learners have insufficient technical skills (Smith, 1999). Lastly, many online instructors have overwhelming workload to interact with every learner by one-on-one mails (Sellani & Harrington, 2002). Fear of technology has been also addressed as a significant problem of online instructors (Simonson et al., 2003).

Consequently, many companies realized that WBT was not a panacea for all types of training in the workplace. Hence, they make an effort to find optimal balance between WBT and traditional classroom training and make more modest investment to WBT with small initial costs (Mullich, 2004). For example, "Basic Blue", IBM's training program for new managers, was trained in a five day workshop in the past. However, IBM changed it to a 12-month training program combining online courses and a five day workshop, since the workshop was not effective to provide all the information in a short time. As a result, they found that mangers can save one third of their training costs and increase their learning performance five-fold (Mullich, 2004).

Assessing the Cost of Training

There are nine categories of the costs of training suggested Jacobs (2005). Work analysis cost is the expenditures occurred in the process of investigating the work for the program. Training development cost is mainly related to the expenditures for subject matter experts or instructional designers who make the program. Trainer cost is the expenditure needed to train the trainers. Consultant cost has to be met, if a company needs experts' advice on training. Material costs are associated with resources used during training. Training evaluation cost is the expenditures needed to analyze the program. Trainer backfill cost is the cost for the trainer to incur new knowledge or skill to teach the program. Trainee's time cost is an opportunity cost that trainees endure during training hours by not doing work. Performance follow-up cost is the expenditures needed to investigate how well the trainees enhance their performance after training.

Concerning type of training costs, Lachance (1999) suggests five categories, including training attendance costs, instructor costs, instructional development personnel costs, additional instructional development costs, and facility, material, & equipment costs. Attendance costs are related to participant's time spent in training, travel and per diem costs, and lost productivity or cost of replacing the individual during training. Instructor costs are associated with instructor's time spent in training, travel and per diem costs, and lost productivity or cost replacing the individual during training. Instructional development personnel costs are the personnel expenditures for the design and development of the training materials. Additional instructional development costs are the resource.

According to Bartolic-Zlomislic & Bates (2002), the costs of WBT can be divided into three factors as follows: capital and recurrent costs, production and delivery costs, and fixed and variable costs. Capital and recurrent costs include equipment and support for a program. Production and delivery costs include the costs that occurred in the process of the delivery and development of a program. Fixed and variable costs remain stable regardless of the number of trainees or any change in the number of trainees.

Willis (2003) suggests that the costs of WBT mainly include academic support services, technology and production services, program administrations, marketing support, and overall program research and development. Academic support services include registration process, shipping materials, and other activities. Technology and production services are associated with technical development, editing, and duplication of a program. Program administration includes reviewing and establishing new programs, certificate initiatives, and short courses, as well as the review, evaluation, and updating of existing programs. Marketing support includes the establishment and maintenance of a high-profile and high-quality web site. Overall program research and development include exploration of alternative hardware/software delivery formats and the exploration of new program content areas.

Assessing the Cost of WBT

To confirm sure that WBT is cost-effective, one must clarify the definitions of costs at all stages of training such as analysis, design and development, promotion, administration, delivery, and evaluation (Shepherd, 2005). Shepherd (2005) also suggests that such indirect costs as internal salaries and benefits of trainers and administrators, the use of internal facilities, and the opportunity cost of trainee's time should be estimated in the process of cost analysis of WBT.

Costs of a program can be divided into its establishment and recurrent costs (Curtain, 2002). In most cases, studies have indicated that development and establishment costs of a program are significantly higher than its delivery costs. Curtain (2002) provides a case study of Department of Animal and Biological Science at Box Hill Institute, which involves establishment cost assessment. In the case of this organization, the development costs of an online course were spent 100% or more additional expense compared with face-to-face delivered courses.

It is difficult to assess accurately recurrent costs, since there are numbers of aspects of recurrent costs on delivering a web-based course. All of them need additional time-consuming tasks (Curtain, 2002). Mistakes in taking the new work process can bring about high costs of the program. Curtain (2002, p 131) provides a case study of ACENET to explain this phenomenon.

> This finding is confirmed in an Australian setting by an incident reported by the ACENET co-ordinator where an instructor was contracted to run a course, Introduction to the internet, available through the Victorian TAFEVC (a 'virtual campus'). Forty students enrolled in the course of Introduction to the Internet. However, due to the limited language and computer skills of the students, the unit had to be customized to meet their specific needs. This was done while paying $1000 for his work. However, it was not anticipated that throughout the course he would receive approximately 500 emails from students requiring help. As a result, the instructor suggested a more appropriate fee for the course would be $4500. ACENET were unable to pay him this amount and so a halfway figure of $2500 was agreed upon.

Traditionally, training evaluation involves both formative and summative evaluation (Noe, 2004, p171-172).

> Formative evaluation refers to evaluation conducted to improve the training process. That is, formative evaluation helps to ensure that (1) the training program is well organized and runs smoothly and (2) trainees learn and are satisfied with the program….. Summative evaluation refers to evaluation conducted to determine the extent to which trainees have changed as a result of participating in the training program. That is, have trainees acquired knowledge, skills, attitude, behavior, or other outcomes identified in the training objectives?

These two approaches should be considered as the evaluating tools for the cost-efficiency of WBT.

There are three benefits in the analysis of cost-efficiency for WBT (Parsons, 1995). Firstly, it can be possible for trainers to see the program in the view of customer's perspectives when trainers deliver the program. Secondly, a clear index can make a direction to discuss the program with key stakeholders. Lastly, it is helpful to make a decision in the stage of developing the program.

The Cost-efficiency tools examined in the previous studies provide an integrated tool for the cost-benefit analysis of WBT (Cukier, 1997). The following three methods are used to analyze cost-efficiency (Wentling & Park, 2002); cost-to-benefit ratio (CBR) (Wentling & Park, 2002), return-on-investment (ROI) (Phillips, 1994), and breakeven point analysis (Whalen & Wright, 1999). The cost-to-benefit ratio is the present benefits of the program divided by initial program costs: CBR = Program benefits/ program costs. The return on investment is the ratio of the net program benefits over program costs. The net program benefits are the program benefits minus the cost: ROI (%) = Net program benefits/ program costs X 100. The breakeven analysis is a tool to determine when the program

will be able to cover all of its costs and begin to make a benefit. In other word, it indicates that the number of students offsets the fixed cost of WBT.

Decision makers and practitioners in the department of training would like to know how much the training has an effect on the company in terms of value or money. They might have some questions: “Does the training have any value?”, “How much is training worth with respect to money?”, and “What is the effect of training in the aspect of investments?” To answer these questions, both the cost-benefit analysis and the total costs of the training should be analyzed. As the first stage of the process, it is necessary to explore what the components of costs should be included in WBT. In other words, it is important for the cost-benefit analysis of WBT to determine the missing components in its total costs.

One of the issues in the field of WBT is investigating the missing components to calculate the total costs of WBT. Although there are some studies on this topic (Willis, 2003; Bartolic-Zlomislic & Bates, 2002), they are insufficient to use generally for the cost analysis of WBT, since they do not take into account hidden factors of the components in online courses. In some cases of WBT, the development costs of a course can be a hidden factor because the course was developed by using existing resources such as a staff member, using work time or partly his/her own time (Curtain, 2002). Also, the opportunity costs of trainees, one of indirect costs is not considered as the part of total costs in WBT.

There are three approaches to explore all of the components associated with costs of WBT. Firstly, the research categorizes the costs of WBT, and then finds the components included in the categories. Willis (2003) categorizes the costs of WBT such as academic support services, technology and production services, program administrations, marketing support, and overall program research and development. In his study, each category has some components. Secondly, each component of costs in WBT would be investigated on the basis of the previous training models. For instance, the components of costs in WBT would be uncovered in the ADDIE model that stands for Analysis, Design, Development, Implementation, and Evaluation (Kruse, 2004). Lastly, the dimensions for the costs can be explored by direct costs and indirect dimension, start up cost and ongoing cost, and fixed cost and unfixed cost. Accordingly, the components of costs would be located in the dimensions explored.

If all of components related to the total costs of WBT are revealed, one of the research issues can be assessing all the components of costs in WBT. It is difficult to assess such the components as equipment (e.g. computers) and the opportunity of trainees. It is often difficult to assess the relative costs of flexible training compared with traditional face-to-face teaching, since the costs based on activities are not recorded in many cases (Australian National Training Authority Unit Costs Working Group, 1997).

In general, a company asks vendors to assess the total costs of WBT, in case a company purchases its online courses from vendors. The Kia Motor Company also requested vendors to calculate costs of web-based management and skill and language training courses. It turned out that the company was hardly able to estimate costs/benefits of its programs and assess the effects of the programs due to the lack of accurate data. These problems occur when both a company and vendors do not have systematic and scientific methods in assessing costs and benefits of the programs. Thus, Jacobs (2005) suggests that it needs strategic training evaluation in the process of calculating the cost analysis of the training in order to assess more effectively costs and benefits of the programs.

Many components of costs in WBT are difficult to assess in terms of money. One of the difficult parts shows how the time invested for WBT can be assessed with money. For example, an instructional designer’s time to develop online courses must be assessed by money. To calculate it, the criteria should be set based on his/her salary or income. The other difficult part is how to assess the opportunity costs of trainees. At this point, the criteria should be established to assess it. In addition, the equipment such as a computer must be assessed, if it needs for the delivery of a program.

The goal of a company is to maximize profits, and this goal is directly related to the survival of a company. WBT should be in line with this view. A company must, by nature, maximize the profits given level of costs or minimize the costs given level of profits. In this sense, finding the optimal level of investment in WBT means a profit maximization problem or cost minimization problem. These two problems are often called “the Duality problems” in Economics (Haugh, 2003).

One should keep in mind that costs and benefits of WBT are intertwined and estimated based on both aspects of the training program to find the optimal level of investment, that is, costs (Phillips, 1994; Whalen & Wright, 1999; Wentling & Park, 2002). Shepherd (2005) suggests that three factors including reducing costs, improving effectiveness, and increasing volumes are intertwined to improve cost effectiveness in the workplace. In this perspective, the optimal standard cost should lead cheaper learning, better learning, and more learning as much as possible.

Needless to say, the purpose of WBT is that the company computes financial benefits derived from having spent money on developing the training programs. Therefore, an organization should build its goals from the

beginning of the training program to produce organizational desired outcomes. The following four elements are critical dimensions to establish goals: personnel, academic programs, facilities, and operational procedures (Chan & Richardson, 2002). Accordingly, the optimal standard cost should be established by those four elements in the process of developing the cost analysis of WBT.

Conclusions

Most decision makers have difficulty in assessing the cost analysis of WBT due to various context of WBT, availability of resources, time limitations, and limited budget and so on. Thus, they frequently make their own decisions to estimate training costs that can not capture accurate training expenditures for the financial benefits of training.

The ultimate goal of cost analysis of WBT provides decision makers or practitioners with accurate data so that they can confidently answer the raised questions: "Does the training have any value?" "How much is training worth with respect to money?" "What is the effect of training in the aspect of investments?" Decision makers will use this study as a guideline of how to calculate accurate costs of WBT.

With this study, they will be able to have deeper insights about identifying critical components of cost analysis, calculating difficult components of cost analysis, and, more precisely, assessing standard costs of WBT in order to reduce the cost of future research. Ultimately, it enables organizations to establish a sound business strategy associated with cost reduction and performance improvement for the investment of WBT.

In addition, further research will be triggered since this study suggests a timely topic in an organization.

This study also has some limitations as follows. Firstly, the study does not introduce a multitude of case studies related to the cost analysis of WBT. That is why the rationale of this study might be weak to discuss the missing components of costs in WBT. Secondly, this study does not provide how to possibly conduct research for the analysis of costs in WBT in detail.

Recommendation for future research includes the following:

1. To explore components of costs in WBT considering hidden factors
2. To assess difficult components with the appropriate model such as mathematical formula or qualitative criteria
3. To set the optimal standard cost for a training considering the effectiveness and efficiency of the training program.

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